

TIME OIL NORTHWEST TERMINAL CSM Site Summary – Appendix A-17

TIME OIL NORTHWEST TERMINAL

Oregon DEQ ECSI #: 170

10350 N. Time Oil Rd.

DEQ Site Mgr: Tom Roick

Latitude: 45.6161°

Longitude: -122.7832°

Township/Range/Section: 2N/1W/34, 35

River Mile: 4 East bank

LWG Member

☒ Yes ☐ No

Upland Analytical Data Status: ☒ Electronic Data Available ☐ Hardcopies only

1. SUMMARY OF POTENTIAL CONTAMINANT TRANSPORT PATHWAYS TO THE RIVER

The current understanding of the transport mechanism of contaminants from the uplands portions of the Time Oil site to the river is summarized in this section and Table 1, and supported in following sections.

1.1. Overland Transport

Little to no overland transport of contaminants via soil erosion occurs at the Time Oil Northwest Terminal (Terminal). The tank farms are surrounded by containment walls or berms. Most of the other areas of the site within the former terminal operations areas are paved or covered with gravel fill and stormwater mainly infiltrates the ground. Any stormwater runoff is collected in the storm drain or treated at the onsite wastewater treatment system. No spills or releases to the surface will occur in the future because the terminal is no longer in operation (Landau Associates 2004).

1.2. Riverbank Erosion

The riverbank is outside the former operation areas of the terminal; therefore, no riverbank sediments have been exposed to materials formerly stored or handled at the terminal. Asphaltic concrete riprap placed at the adjacent Schnitzer property has eroded and moved downstream onto an area of the Terminal riverbank.

1.3. Groundwater

Groundwater flow direction in the upper and lower groundwater zones at the Terminal is toward the Willamette River (Landau Associates 2004). Consequently, there is a potential for dissolved chemicals in groundwater or LNAPL from the Main Terminal tank farm to be transported to the river by groundwater flow. Because seeps have not been observed in the riverbank adjacent to the Terminal, groundwater likely discharges to the river below the water line. Additionally, the east-west trending storm drain could historically have provided a preferential pathway for the transport of pentachlorophenol (PCP)-impacted groundwater originating from the wood treatment product formulation source area to the river; however, capture of shallow groundwater with the groundwater intercept system installed in the storm drain line (and the proposed use of *in situ* chemical oxidation in the PCP plume areas) provides capture of contaminant migration in groundwater from this source area to the river (Landau Associates 2004).

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mg/kg, respectively) at this depth occurred at LW-35D located in the northwest corner of the Main Terminal. Detectable concentrations of PAHs were also reported for soil collected from the capillary fringe depth interval at three locations along the western property boundary in the Main Terminal, including location LW-35D.

- In the Bell Terminal, the highest concentrations of contaminants in soil occur west of the tank farm near where the east-west trending pipeline formerly existed but was demolished by Schnitzer in the mid-1970s while still in use and containing product. Diesel-range and gasoline-range petroleum hydrocarbons were found at the capillary fringe depth at this location at concentrations of 12,700 mg/kg and 8,750 mg/kg, respectively. Other elevated concentrations of TPH were observed at the capillary fringe depth along the western property boundary of the Bell Terminal and appear to be related to activities in this area when used by operators of the adjacent Schnitzer property. Within the central portion of the Bell Terminal, gasoline-range and diesel-range petroleum hydrocarbon concentrations appear to have originated from different sources than those along the western property boundary because of the decreases in concentrations between the two areas. The TPH concentrations within the central portion of the tank farm are likely a result of minor, incidental releases related to operations within the Bell Terminal.
- Soil with elevated concentrations of diesel-range and gasoline-range petroleum hydrocarbons, PAHs, VOCs, and metals is found in the loading rack/entrance area of the Main Terminal at the capillary fringe. Elevated concentrations of diesel-range and gasoline-range petroleum hydrocarbons were also detected at the same depth interval.
- Within the Phase II study area, PCP concentrations ranging from nondetected to 180 mg/kg remain in soil at depths at and greater than about 13 ft BGS. This soil was not excavated during the removal action performed in the former PCP mixing area due to limitations in excavating soil below the water table and the plan to use *in situ* chemical oxidation (ISCO) to remediate soil and groundwater at this depth. Other constituents (diesel-range, motor oil-range, and gasoline-range TPH, PAHs, VOCs, and metals) are present in the surface soil and at depths at or deeper than the capillary fringe.

10.1.2. Riverbank Samples

☐ Yes ☒ No

10.1.3. Summary

Placeholder.

10.2. Groundwater

10.2.1. Groundwater Investigations

☒ Yes ☐ No

Time Oil has collected groundwater samples at the terminal since the mid-1980's. Since March 1997, groundwater samples have been collected on a quarterly basis as part of RI activities. The most recent groundwater data set discussed herein is from the October 2003 quarterly groundwater monitoring event. Groundwater sampling locations for the Phase III RI are shown on Supplemental Figure 2-6 (Landau Associates 2004) of Attachment A.

10.2.2. NAPL (Historic & Current)

☒ Yes ☐ No

- LNAPL has been observed in the upper zone groundwater in the Main Terminal tank farm area at monitoring wells N, P, Q on a semi-regular basis since installation

in 1994 and direct push monitoring point GW8-1 when drilled in 2001. LNAPL was also observed at wells LW-21S and LW-27S during the February 2004 groundwater monitoring event. The thickness of LNAPL present at these locations varies over time and between locations. The thicknesses range from 0.01 to 1.2 ft.

- No LNAPL was observed on upper zone groundwater in the Bell Terminal.
- Occasional observations of LNAPL have also been recorded for upper zone groundwater monitoring wells associated with the former PCP mixing area between November 2000 and October 2003. These wells include OX-2S, LW-8S, and LW-11S and piezometer PZ-2. LNAPL thicknesses at these locations since the soil removal action have ranged from 0.04 to 0.37 foot. Based on chemical characteristics, the LNAPL occurring in this area appears to be related to activities performed in the former PCP mixing area and not related to LNAPL observed in the Main Terminal tank farm area. LNAPL presence is also related to seasonal groundwater fluctuations.
- No NAPL has been reported for the lower zone groundwater at the Terminal.

10.2.3. Dissolved Contaminant Plumes

☒ Yes ☐ No

Dissolved contaminant plumes in upper and lower zone groundwater beneath the Terminal are typically associated with gasoline and diesel releases in the tank farm areas and releases within the former PCP mixing area. Plume characterization is complete with submittal of the Phase III RI; however, groundwater concentrations will continue to be monitored on a quarterly basis through 2004 (Landau Associates 2004).

Plume Characterization Status ☐ Complete ☐ Incomplete

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Plume Extent

Previous groundwater monitoring data have focused on areas of the site impacted by activities in the former PCP mixing area. The RI for the other areas of the terminal was recently completed in early 2004. Therefore, this plume extent discussion focuses on the areas and contaminants of concern associated with the former PCP mixing area. The discussion below under current plume data includes results from other parts of the terminal and for other constituents based on the October 2003 data.

Upper Zone:

Historically and currently, PCP in the upper zone is limited to a narrow plume that extends from the former PCP mixing area downgradient about 450 ft to the south/southwest. PCP concentrations in the upper zone are most elevated within and just downgradient of the former PCP mixing area, the identified source area for PCP. PCP appears to have migrated in a downgradient direction toward the south-southwest. In May 1999, PCP concentrations were observed at a maximum concentration to date of 23,000 µg/L at well LW-11S, but there were only slight increases at well LW-4S, the most downgradient well where there have been consistent low level PCP detections. PCP has not migrated in the upper zone farther downgradient to the south than well LW-13S, as indicated by nondetected concentrations in upper zone wells near the south property boundary (LW-10S, when saturated); however, low level PCP concentrations in lower zone wells on the western extent of the confining unit were detected during the four sampling events in 2003, as discussed below.

Lower Zone:

Historically and currently, PCP in the lower zone consists of several discrete areas of contamination rather than a contiguous plume. Historically, the discrete areas were mainly located within and downgradient of the former PCP mixing area, in proximity to well LW-11D, and in an area including wells LW-4D and RW-2, approximately 450 ft downgradient and to the south/southwest of the former PCP mixing area. The historically highest PCP concentrations in groundwater in the lower zone occurred at well LW-4D (18,000 ppb in October 1997) and decreased significantly at this location, such that since spring 1999, PCP concentrations have been mostly nondetect. These reductions in PCP concentrations are likely related to operation of nearby groundwater recovery well (RW-2; see Section 11.2). Recently, (since November 2002) on an intermittent basis, low level PCP concentrations (generally less than 1 µg/L) have also been detected in wells LW-6D located between LW-4D and the river, and LW-10D located at the southern property boundary. These detections are not observed on a consistent basis, which may be related to dilution of groundwater by river water at the groundwater-surface water interface, (particularly in the lower zone where the river stage influence is greatest), natural attenuation processes (e.g., adsorption, biodegradation; etc.), or seasonal variability.

Min/Max Detections (Current situation)

The October 2003 minimum and maximum groundwater plume detections at the site for both the upper and lower zones include:

Analyte	Minimum	Maximum	Detection Limits (Units)
Total Petroleum Hydrocarbons (TPH)			
TPH-Diesel	260	5,800	250 µg/L
TPH-Gasoline	350	24,000	250 µg/L
Volatile Organic Compounds (VOCs)			
Benzene	1.5	1,600	1.0 µg/L
Toluene	1.2	72	1.0 µg/L
Ethylbenzene	2.6	940	1.0 µg/L
Total Xylenes	1.0	3,170	1.0 µg/L
Semivolatile Organic Compounds (SVOCs)			
Naphthalene	1.3	190	0.1 µg/L
PCP	0.58	2,100	0.5 µg/L

Current Plume Data

Plume maps showing the extent of impacted groundwater for petroleum constituents (TPH-diesel and TPH-gasoline), VOCs (benzene), and PCP are shown on Figures 3 and 4 for the upper and lower zones, respectively, based on concentration contours maps presented in the Phase III RI (Landau Associates 2004). Terminal-wide sampling of groundwater is currently being conducted on a semi-annual basis; sampling of groundwater in areas previously associated with the petroleum operations at the terminal are being sampled on a quarterly basis. Groundwater interim action wells and water from

the groundwater intercept system in the storm drain are sampled at least on a quarterly basis. A summary of the current plume data is provided for each zone below.

The nature and extent of contamination in groundwater is evaluated by areas, as described above for the soil evaluation, and by groundwater zones.

Upper Zone:

- Diesel-range and gasoline-range petroleum hydrocarbons are present throughout the upper zone groundwater in the Main Terminal tank farm area at concentrations ranging from nondetect to 24 mg/L. Constituents typically associated with diesel-range and gasoline-range petroleum hydrocarbons (i.e., PAHs and VOCs) are also present in the upper zone groundwater in the Main Terminal tank farm area but these plumes are not as widespread as the TPH plumes. Metals were detected in the upper zone groundwater throughout the Main Terminal tank farm area at concentrations typically less than site-specific background concentrations (Landau Associates 1999).
- Concentrations of petroleum hydrocarbons present in the upper zone groundwater in the Bell Terminal tank farm indicates that there are three likely sources of contamination in the Bell Terminal: 1) near the location of a rupture along the western portion of the east-west trending pipeline where Schnitzer demolished the pipeline while still in use and containing product, 2) along the western property boundary south of the pipeline resulting from activities by operators of the adjacent Schnitzer property, and 3) the central portion of the Bell Terminal, likely resulting from minor, incidental releases related to Terminal operations. The maximum concentration of petroleum hydrocarbons in upper zone groundwater in the Bell Terminal (796 mg/L for diesel-range hydrocarbons) was found near the western property boundary. Within the central portion of the Bell Terminal, gasoline-range and diesel-range petroleum hydrocarbon concentrations appear to have originated from different sources than those along the western property boundary because of the decreases in concentrations between the two areas and resulting discontinuity between the plumes (Landau Associates 2004). Constituents associated with diesel-range and gasoline-range petroleum hydrocarbons (i.e., PAHs and VOCs) are also present in the upper zone groundwater in the Bell Terminal; however, the areas of impacted groundwater appear to be smaller than the areas of TPH-impacted groundwater.
- The gasoline-range TPH and VOC plumes present in upper zone groundwater in the Main Terminal tank farm area also include the western portion of the loading rack/entrance area.
- No VOCs or PAHs were detected in upper zone groundwater directly to the east and upgradient of the former operating portions of the Terminal.
- The only significant plume of contamination in upper zone groundwater associated with the former PCP mixing area is PCP. Based on the fourth quarter 2003 groundwater data, PCP concentrations range from 0.61 µg/L to 2,100 µg/L and extend approximately 350 ft downgradient from the PCP mixing area. However, historical PCP concentrations within the upper zone have been as high as 23,000 µg/L at well LW-11S.

- Concentrations of diesel-range and gasoline-range petroleum hydrocarbons and VOCs downgradient of the former PCP mixing area are likely related to the presence of PCP carrier oils (e.g. mineral spirits) as LNAPL and partitioning of these constituents into groundwater. The distribution of detected petroleum hydrocarbon concentrations in this area is consistent with the intermittent presence of LNAPL observed in well LW-11S and the recent occurrence of LNAPL at OX-2S and elevated PCP concentrations in groundwater.
- Separate plumes of diesel-range and gasoline-range petroleum hydrocarbons and VOCs are observed in the upper zone groundwater within and downgradient of the former PCP mixing area. These concentrations do not appear to originate from the tank farm areas and are likely related to the presence of PCP carrier oils (e.g., mineral spirits) as light non-aqueous phase liquid (LNAPL) and to the partitioning of these constituents into groundwater.

Lower Zone:

- Diesel-range and gasoline-range petroleum hydrocarbons, PAHs, VOCs, and metals are present in the lower zone groundwater along the western portion of the Main Terminal tank farm where the confining unit is discontinuous or not present and the upper and lower groundwater zones converge; however, concentrations are typically significantly less than those detected in the upper zone groundwater in these areas. Within the western portion of the Main Terminal tank farm, where the confining unit is present, fewer occurrences of contaminants in the lower zone groundwater are observed.
- PCP is detected in the lower zone groundwater within and downgradient of the former PCP mixing area at concentrations less than 1 µg/L. This distribution of PCP concentrations in lower zone groundwater in this area reflects downgradient movement from a historically high PCP concentration area and the influence of recovery well RW-2. Detections of diesel-range petroleum hydrocarbons are observed in the lower zone groundwater in these areas at concentrations up to 3.1 mg/L.
- Except for diesel-range petroleum hydrocarbons and metals, contaminants are not present in the lower zone groundwater in the Bell Terminal tank farm area. A low level concentration of diesel-range petroleum hydrocarbons (0.35 mg/L) was observed at well LW-32D and metals (chromium, copper, nickel, and zinc) were observed at three lower zone monitoring well locations at concentrations ranging from 0.004 to 0.01 mg/L.
- Metals concentrations in the lower zone are typically greater than upper zone and are unlikely related to operations at the Terminal (Landau Associates 2004).

Preferential Pathways

The east-west trending storm drain that discharges to the Willamette River and backfill associated with its construction appear to affect groundwater flow and contaminant transport in the upper zone (Attachment A; Supplemental Figures 2-1 and 2-6). The presence of the storm drain may partly explain the southerly components of upper zone groundwater flow in the Terminal area as groundwater flows toward the zone of higher hydraulic conductivity. The storm drain does not appear to fully penetrate the confining unit (where present) and thus is not thought to provide a vertical pathway for groundwater flow and contaminant transport to deeper aquifers. Groundwater samples collected from manholes in the storm drain and at the storm drain outfall in the river indicate that,

historically, the storm drain was acting as a preferential pathway for upper zone groundwater to the river. In October 2002, the stormwater intercept system was installed to eliminate the potential for upper zone groundwater to migrate through the storm drain to the river.

Other subsurface utilities include thousands of feet of pipeline underlying the facility and adjacent areas, including public utilities (e.g., electrical and water) and private utilities (e.g., hydrant lines). As-built utility drawings maintained by Time Oil indicate that none of these subsurface utilities intersect shallow groundwater and therefore, do not represent preferential pathways at the property.

Downgradient Plume Monitoring Points

Seven lower zone monitoring wells at the top of the riverbank represent the most downgradient monitoring points between the terminal and the Willamette River. All but two of these wells were installed in fall 2003 and the first sampling event was in October 2003; therefore the data presented below are for this one sampling event.

Analyte	Minimum	Maximum	Detection Limits (Units)
Total Petroleum Hydrocarbons (TPH)			
TPH-Diesel	1.1	3.1	0.25 mg/L
TPH-Gasoline	0.43	0.92	0.25 mg/L
Volatile Organic Compounds (VOCs)			
Benzene	2.9	40	1.0 µg/L
Toluene	1.2	1.6	1.0 µg/L
Ethylbenzene	ND	ND	1.0 µg/L
Total Xylenes	1.2	1.6	1.0 µg/L
Semivolatile Organic Compounds (SVOCs)			
Naphthalene	ND	ND	0.1 µg/L
PCP	1.1	1.1	0.51 µg/L

Visual Seep Sample Data

☐ Yes ☒ No

No seeps have been observed along the riverbank at the terminal.

Nearshore Porewater Data

☐ Yes ☒ No

Placeholder.

Groundwater Plume Temporal Trend

- Upper zone PCP concentrations within the mixing area source area have decreased significantly since first measured in 1991. This decrease may reflect the removal of contaminant source material during the 1989 soil excavation within the former PCP mixing area, as well as natural attenuation of the PCP (through adsorption, biodegradation, etc.) or downgradient movement past these monitoring points.
- Continuing decrease of PCP concentrations in the upper zone since 2002 is likely related to the removal of the majority of the remaining contaminated soil during the soil removal in the former PCP mixing area and from use of the ISCO technique during pilot testing.

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- Since October 2000, recovery well RW-2 has been recovering PCP-impacted groundwater from the lower zone. RW-2 has been generally effective in containing PCP-contaminated groundwater migration.

The intermittent nature of LNAPL occurrences at LW-11S appears to be related to seasonal groundwater fluctuations, such that residual LNAPL is released to the groundwater under low water table conditions.

10.2.4. Summary

The most critical exposure pathway at the Terminal is migration of contaminants via groundwater to the Willamette River. Even though impacts from discharge of groundwater from the Terminal are expected to be minimal because of dilution and other processes at the groundwater-surface water interface, there is a potential for impacted groundwater to affect sediment or surface water quality. Also, historically, the storm drain acted as a preferential pathway for migration of contaminants to the river from upper zone groundwater in the area of the PCP plume.

In the Main Terminal tank farm area, contaminants are present in the upper and lower zone groundwater. Concentrations of selected contaminants in upper zone and lower zone groundwater indicate that lateral migration in the downgradient groundwater direction has occurred (Figures 3 and 4). However, contamination of the lower zone groundwater is typically found only at downgradient monitoring locations in the western portion of the Main Terminal tank farm where a silt layer separating the upper and lower zones does not exist or is discontinuous. In this portion of the Main Terminal tank farm area, only a single unconfined groundwater zone exists. In the eastern portion of the Main Terminal tank farm, where a silt layer separating the upper and lower groundwater zones does exist, contaminant concentrations in the lower zone groundwater are typically low and are primarily detected near where the silt layer pinches out or becomes discontinuous. This suggests that the silt layer over much of the western portion of the Main Terminal tank farm area provides a natural geologic/hydrogeologic boundary between the upper zone groundwater and the lower zone groundwater, limiting the vertical migration of contaminants over this portion of the Main Terminal tank farm area, or that the characteristic of the contaminant does not lend itself to vertical migration.

In the Bell Terminal tank farm area, contaminants are present in the upper zone groundwater, but are not detected or detected at low concentrations in the lower zone groundwater. The minimal presence of contaminants in the lower zone groundwater indicates that the silt layer is acting as an impermeable boundary and the two groundwater zones are not interconnected in this area.

10.3. Surface Water

10.3.1. Surface Water Investigation

☐ Yes ☒ No

10.3.2. General or Individual Stormwater Permit (Current or Past)

☒ Yes ☐ No

Permit Type	File Number	Start Date	Outfalls	Parameters/Frequency
1200-T	109186	8/13/96	River	Oil & Grease; pH; total Phosphorus; COD; TOC; metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn); TSS
1200-Z	109186	11/6/97	River	Oil & Grease; total copper, lead, zinc; pH; TSS
1200-C (east property only)	109737	11/16/01		Turbidity

Do other non-stormwater wastes discharge to the system? ☐ Yes ☒ No

The stormwater system at the Northwest Terminal consists of a 15-inch-diameter concrete storm drain line running east-west along the length of the Terminal about 160 ft north of the southern property boundary, four manholes, and a single outfall to the Willamette River (Attachment A; Supplemental Figures 2-1 and 2-6; Landau Associates 2004). Stormwater from the Terminal entrance area, the low topographic area east of the rail spur, and the undeveloped eastern portion of the property is collected into the main storm drain line for discharge into the river. In the fall of 2002, a groundwater intercept system was installed within the east-west trending storm drain to capture groundwater infiltrating into the concrete storm drain line between the two stormwater manholes located closest to the river, as described in Section 11.2.

10.3.3. Stormwater Data

☒ Yes ☐ No

Stormwater data were collected from the groundwater intercept system that is located in a catch basin in the east-west trending storm drain. Stormwater data collected between September 2001 and August 2002 at the catch basin closest to the river contained PCP concentrations ranging from 0.7 to 190 µg/L. Petroleum compounds (TPH -diesel, -gasoline, -mineral spirits, -kerosene, -lube oil) ranged from nondetect to 0.3 mg/L. The groundwater intercept system in the storm drain began operation in October 2002. Stormwater samples continue to be analyzed as influent into the onsite wastewater treatment system; however, these concentrations represent groundwater captured by the intercept system and do not reach the river outfall. When accessible during low river flow periods, stormwater will also be collected from the river outfall.

10.3.4. Catch Basin Solids Data

☐ Yes ☒ No

Catch basin solids have not been sampled.

10.3.5. Wastewater Permit

☒ Yes ☐ No

Permit Type	Permit No.	Start Date	Outfalls	Volumes	Parameters/Frequency
POTW	400-121	2/15/96	Sanitary sewer	None specified	PCP, BETX, pH

10.3.6. Wastewater Data

☒ Yes ☐ No

Wastewater effluent samples are collected from the onsite wastewater treatment system in accordance with the permit requirements. Wastewater effluent concentrations typically

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meet the maximum allowable limit for PCP at 40 µg/L. Wastewater effluent is discharged to the city sanitary sewer along Time Oil Rd.

10.3.7. Summary

Historically, there was a potential for impacted groundwater to reach the river through the storm drain. Currently, there is little to no potential for contaminated groundwater to reach the river through the storm drain due to operation of the groundwater intercept system (Landau Associates 2004). Wastewater treated at the onsite wastewater treatment system is discharged to the POTW under a permit with the City of Portland.

10.4. Sediment

10.4.1. River Sediment Data

☒ Yes ☐ No

Two sediment investigations have taken place in the vicinity of the terminal since 1997:

- Portland Harbor Sediment Investigation (Weston 1998)
- LWG Round 1 Sediment Sampling (Integral in prep.).

Time Oil has collected no site-specific sediment data. Table 2 summarizes the results from these investigations.

10.4.2. Summary

See Final CSM update.

11. CLEANUP HISTORY AND SOURCE CONTROL MEASURES

11.1. Soil Cleanup/Source Control

In 1985, 288 yd³ of PCP-contaminated soil from the former PCP mixing area were removed and disposed at Arlington. In 1989, approximately 4,000 tons of soil was excavated from the former PCP mixing area and placed into a bermed, lined, and covered stockpile adjacent to the area. The excavated area was backfilled with clean soil. In 1996-97, isolated areas of PCP-impacted soil were removed from the east property; the soil was added to the soil stockpile. In 2002, the soil stockpile was removed and an additional approximately 5,700 tons of PCP-impacted soil was excavated from the former PCP mixing area for treatment and disposal at an incineration facility in Alberta, Canada. The warehouse used for wood treatment product mixing activities was decontaminated and demolished for recycling/disposal offsite. About 819 tons of cPAH-impacted soil from removed from the former Crosby & Overton tank area for treatment and disposal offsite. Approximately 1,732 tons of cPAH-impacted soil was removed from the east property for offsite treatment and disposal. Approximately 90 tons of mixed asbestos-containing material were removed from the east property and disposed offsite. Other soil removals have been associated with the cleanup of isolated petroleum product releases, as documented in earlier sections.

11.2. Groundwater Cleanup/Source Control

In 1999-2000, a groundwater interim action system was implemented to treat PCP-impacted groundwater in the upper and lower zones. The system consists of two groundwater extraction wells, a horizontal well (HRW-1) in the upper zone and a vertical well (RW-2) in the lower zone, and a groundwater intercept system in the east-west trending storm drain at the manhole closest to the Willamette River (SDM-1). Recovery well locations and the storm drain are shown on Supplemental Figure 2-6 (Landau Associates 2004) in Attachment A.